PATENT
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Mark D. Levitt, Bryan M. Anderson, Keith E. Olson and Kim R. Smith

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For:	STRIPPABLE LAMINATE FINISH

Group Art Unit: 1773
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Examiner: Sheeba Ahmed

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Pursuant to 37 CFR 1.8, I certify that this correspondence is being sent to the telephone number shown below, addressed to Mail Stop: Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the below indicated date.	
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Declaration Under 37 CFR §1.132 of Robert D. P. Hei

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I, Robert D. P. Hei, hereby declare that:

1. I received a Bachelor of Arts degree in Chemistry from the University of St. Thomas in St. Paul, Minnesota in 1981 and a PhD degree in Organic Chemistry from the University of North Dakota in Grand Forks, North Dakota in 1985. I did Post-Doctoral work in nuclear magnetic resonance spectroscopy at the University of Minnesota in Minneapolis, Minnesota in 1986.

2. From 1985 to the present I have been employed in the Research, Development and Engineering Department of Ecolab Inc., where I develop new product formulations and technologies, and currently lead a team working on floor care compositions and systems.

3. I am an inventor or co-inventor of at least 40 issued U. S. patents.

4. I have read the above-identified application (the "Application"), the Office Action mailed April 16, 2004, cited Published PCT Application Nos. WO 94/22965 (Koreltz et al.) and WO 98/11168 (Hamrock et al.) and cited U.S. Patent No. 6,444,134 B1 (Holman et al.).

5. The Office Action says that "All imitations of claims 33-35 are disclosed" in Koreltz et al. I disagree. Koreltz et al. describe compositions for stripping "standard floor finishes and/or greasy residues from hard surfaces such as floors" (see for example page 1, lines 5-8 and page 3, line 35 through page 4, line 2). The phrase "standard floor finishes" refers to traditional easy-to-strip floor finishes. Koreltz et al.'s working examples show that CITATION™ urethane sealant/finish from Buckeye International, Inc. can be removed using Koreltz et al.'s strippers (see Koreltz et al. at page 12, lines 12-18). CITATION sealant/finish is relatively easy to strip, and can be used as an intermediate coating in the Application (see for example page 5, line 26). CITATION sealant/finish does not provide a "radiation cured overcoat" as recited in claims 33 – 35. Radiation cured finishes are not mentioned in Koreltz et al., and are much harder to strip than standard materials such as CITATION sealant/finish. A person having ordinary skill in the floor finish art would not conclude from tests based on stripping CITATION sealant/finish that Koreltz et al.'s stripping agents could be used to remove more durable materials such as a radiation cured overcoat. To help demonstrate this I requested preparation of several test panels as follows. A new vinyl composition tile was coated with 10 coats of CITATION sealant finish, cut into strips and dried in an oven as described by Koreltz et al. at page 12, lines 12 – 25 (but using 50° C aging for three days rather than 49° C aging for three days). This provided a 3.8 g total dry coating weight on each strip. Koreltz et al.'s Concentrate #1 was selected for stripper testing because it appeared to offer better overall stripping performance than Concentrate #2. Concentrate #1 was prepared substantially as described by Koreltz et al. in the center column of Table A at page 7 except that the fluorochemical surfactant FLUORAD™ FC-4430 (commercially available from 3M Company) was substituted for fluorochemical surfactant FLUORAD™ FC-135 (the latter surfactant is no longer available from 3M Company), and the unidentified dye and chelating agent were omitted. The dye would not be needed to perform a stripping test and the chelating agent would not be needed if deionized rather than tap water was used to dilute the stripper concentrate. A stripper solution was prepared by diluting Concentrate #1 with deionized water at a 1:10 dilution, and

used in a 2.5 minute dip stripping test as described at page 12, line 26 though page 13, line 24. Concentrate #1 was used at a 1:10 dilution because the 1:10 dilution had the second highest observed percent removal (90%) in Koreltz et al.'s tests, and contained more benzyl alcohol than the other strippers and dilutions in Koreltz et al.'s Table 1. The oven-dried 10 coats of CITATION sealant finish were completely removed in the 2.5 minute dip test. This is in effect what was shown in Koreltz et al., and is not surprising given that CITATION sealant/finish is relatively easy to remove whether 1 coat or 10 coats have been applied.

6. At my request the above experiment was repeated using tile strips optionally coated with a single coat of CITATION sealant/finish and overcoated with a single coat of a highly durable waterborne radiation curable finish, identified as Finish 4 in the Appendix to this Declaration. Finish 4 was coated using a flocked pad at a rate sufficient to provide a 3.8 g total dry topcoat weight and UV cured. The results are shown below:

Dip Test Results Using Koreltz et al. Composition #1 at 1:10 Dilution

Undercoat	Overcoat	2.5 Minute Dip Test Results
None	Finish 4 – Waterborne UV-Crosslinkable	No stripping
CITATION Sealant/Finish	Finish 4 – Waterborne UV-Crosslinkable	No stripping

The results show that tests of a Koreltz et al. stripper using Koreltz et al.'s 2.5 minute dip test did not remove a UV-cured waterborne overcoat whether applied as a single layer or in a laminate finish.

7. At my request the above experiments were repeated using tile strips optionally coated with a single coat of CITATION sealant/finish, overcoated with a single coat of Finish 4, and stripped using a 2.5 minute dip test employing a 1:10 dilution of the stripper shown in the Appendix. This stripper is similar but not identical to Test Strip Agents F through I at pages 9 – 10 of the Application. The results are shown below:

Dip Test Results Using Appendix Stripper
at 1:10 Dilution, 2.5 Minute Dip Test

Undercoat	Overcoat	2.5 Minute Dip Test Results
None	Finish 4 – Waterborne UV-Crosslinkable	No stripping
CITATION Sealant/Finish	Finish 4 – Waterborne UV-Crosslinkable	No stripping

The results show that Finish 4 was not removed using the Appendix stripper in a 2.5 minute dip test.

8. A 2.5 minute dip test does not provide a very long stripper exposure time, and may not be sufficient for removing a highly durable finish, especially if applied at high coating weights. At my request the above experiments were repeated using tile strips optionally coated with a single coat of CITATION sealant/finish, optionally overcoated with Finish 4 or Finish 5, and stripped for 30 minutes using the Koreltz et al. stripper (Composition #1 at 1:10 Dilution) or the Appendix stripper and a test similar but not identical to the First Strippability Evaluation Method described at pages 11 – 12 of the Application. The test was carried out by affixing an adhesive-backed 13 mm inside diameter foam ring to the coated surface. The inner portion of the ring was filled with the diluted stripper solution. The stripper solution was allowed to contact the coating surface for 30 minutes and then poured out of the ring. The coating surface was rinsed with tap water. The treated area was viewed in relation to the untreated area by peeling the foam ring away from the coating and briefly wiping with a paper towel to remove loose finish. A visually determined stripping performance was recorded using a 0 – 5 scale similar to the 1 – 6 scale shown at pages 11 – 12 of the Application, with a 0 rating corresponding to no effect and a 5 rating corresponding to complete stripping. The results for a 30 minute stripper contact time are shown below. In line 4 of the table Finish 4 was applied at a rate sufficient to provide a 1 g rather than a 3.8 g total dry coating weight on the strip, as this seemed to aid stripping and would still provide ample durability:

Undercoat	Overcoat	Stripper	30 Minute Foam Ring Test Results
None	Finish 4 – Waterborne UV-Crosslinkable	Koreltz et al. Stripper	0 – No stripping
CITATION Sealant/Finish	Finish 4 – Waterborne UV-Crosslinkable	Koreltz et al. Stripper	0 – No stripping
None	Finish 4 – Waterborne UV-Crosslinkable	Appendix Stripper	0 – No stripping
CITATION Sealant/Finish	Finish 4 – Waterborne UV-Crosslinkable at 1 g coating weight	Appendix Stripper	5 – Complete stripping

The results show that Finish 4 when applied alone was not removed using the Koreltz et al. stripper or the Appendix stripper in a 30 minute strip test but that a laminate finish made by applying Finish 4 over CITATION sealant/finish was completely removed using the Appendix stripper. This demonstrates an important advantage of the claimed methods. A highly durable waterborne radiation cured overcoat that when applied alone is unstrippable or very difficult to strip became strippable when applied over an undercoat.

9. The Office Action says that "it would have been obvious to one having ordinary skill in the art to replace the radiation curable coating comprising a polyfunctional isocyanurate and a hydroxyalkyl acrylate, as taught by Hamrock et al., with a water based finish including urethane and acrylic polymers and copolymers and crosslinking agents given that Holman et al. specifically teach that such water-borne coatings exhibit high hardness, flexibility, UV resistance, chemical resistance and abrasion resistance". I disagree. Hamrock et al. describe a vinyl floor coating system that may employ a primer coating and a 100% solids radiation curable overcoat. The overcoat is based on a specially formulated polyfunctional isocyanurate monomer. Hamrock et al. do not disclose a waterborne overcoat. A person having ordinary skill in the floor finish art

who consulted Hamrock et al. would not use such waterborne overcoats. Hamrock et al. say that commercially available aqueous emulsion based floor finishes "have been less than completely satisfactory for several reasons" including their "relatively low solids content" and the need to dry each successive application of the finish composition "before additional coatings are applied and/or before pedestrian traffic is allowed across the treated floor" (see page 1, lines 19-27). These are reasons not to use a waterborne overcoat.

10. Holman et al. do not describe finishes like those described by Hamrock et al., and do not relate to strippable finishes. Holman et al. describe a hardwood floor refinishing system meant to avoid the sanding step that typically is required when completely removing and renewing a hardwood floor finish (see e.g., col. 1, lines 9-35 and col. 2, lines 18-20). Hardwood floors whose finish has deteriorated are usually sanded to remove the old finish and then recoated (see e.g., Holman et al. at col. 1, lines 15- 35). Holman et al. propose to instead etch an existing hardwood floor finish using a caustic solution (see e.g., col. 2, lines 30-38 and col. 3, lines 39-50), to rinse the etched surface and then to apply a water-based renewal finish. Holman et al. do not strip the underlying finish and do not say that their renewal finish is strippable. Holman et al. leave some of the underlying finish in place and apply the renewal finish over it (see e.g., col. 2, lines 34 – 37). Holman et al. also say that their renewal finish has "chemical resistance" (see e.g., col. 4, lines 31 – 35 and 59 – 63). A person having ordinary skill in the floor finish art who consulted Holman et al. would not use Holman et al.'s renewal finish where strippability was desired. Chemical resistance is contrary to strippability and a reason not to use Holman et al.'s renewal finish. It is also a reason not to use Holman et al.'s renewal finish in place of Hamrock et al.'s radiation curable overcoat.

11. In my opinion a person having ordinary skill in the floor finish art would not substitute a part of Holman et al.'s system (namely, the chemically resistant water-based renewal finish) for a part of Hamrock et al.'s system (namely, the 100 % solids radiation curable overcoat). Doing so would involve substituting a component of a hardwood floor refinishing system that is not said to be strippable for the upper layer of a vinyl floor coating system that should be strippable. Doing so would also be contrary to Hamrock et al.'s statements that finishes with an aqueous emulsion formulation, low solids content or an air drying requirement are "not completely satisfactory". Moreover, doing so would be contrary to the ordinary

expectation of persons skilled in the floor finish art that a "chemically resistant" coating should not be used where strippability is required. Thus for at least these reasons I do not believe that a person having ordinary skill in the floor finish art would combine Hamrock et al. and Holman et al. as proposed in the Office Action.

12. So far as I am aware the Hamrock et al. system has not been commercialized. In my experience, 100% solids radiation curable coatings like those described by Hamrock et al. may have poor spreading or coating characteristics. I do not know whether persons having ordinary skill in the floor finish art who do not work for Ecolab Inc. are aware of these problems. Also, I do not have access to Hamrock et al.'s formulation, as I do not have Hamrock et al.'s polyfunctional isocyanurate monomer. My Ecolab Inc. colleagues and I have observed however that some 100% solids radiation curable coatings tend to have a high viscosity and a ridged surface appearance after cure. This ridged surface often resembles paint having large and visually apparent brush marks, even though a pad rather than a brush may have been used to apply the coating. Such a ridged surface would be unacceptable to end users. My colleagues and I have also observed that 100% solids radiation curable coatings may be formulated using lower viscosity monomers to reduce the coating viscosity and thereby discourage ridge formation. However, my colleagues and I have observed that when such reduced viscosity coatings are applied atop a strippable intermediate coating to form a laminate finish, the cured overcoat tends to have very uneven gloss. This uneven gloss resembles a freshly-applied lacquer finish which may have non-glossy and glossy areas during a portion of its drying cycle. My colleagues and I call this uneven gloss appearance "diving" when it persists in a laminate finish after the overcoat has completely cured or dried. I believe that diving may be caused by an attack by low viscosity monomers in the overcoat upon the hardened undercoat. A laminate finish that exhibited diving would be unacceptable to end users.

13. To help demonstrate the ridged and uneven gloss surface appearances mentioned above, I requested preparation of several resilient flooring test panels, made as follows. Black 305 mm X 305 mm vinyl composition tiles were cleaned and roughened until no longer shiny, by rubbing with MAGICSCRUB™ mild abrasive cleaner (commercially available from Ecolab Inc.) using a non-woven SCOTCH-BRITE™ green abrasive scrub pad (commercially available from 3M Company). The cleaned tiles were rinsed with tap water and dried at room temperature. A

single layer of PADLOCK™ acrylic polymer floor finish (16% nonvolatiles, commercially available from Ecolab Inc.) was applied to the cleaned tiles using a commercially available microfiber pad and a 0.19 g/m^2 wet coating rate. This provided an "intermediate coating" according to the Application. The coated tiles were then overcoated with a single layer of the five different overcoats identified as Finish 1 through Finish 5 in the Appendix to this Declaration. The five overcoat formulations were coated at the following coating weights using a microfiber pad for Finish 1 and a flocked pad for Finish 2 through Finish 5, and had the following appearance after drying or UV cure:

Laminate Finish Overcoat	% Solids	Dry coating weight, g/m^2	Dried Overcoat Appearance
Finish 1 - Metal-Crosslinked Acrylic	32	0.12	Very good
Finish 2 - UV-Crosslinkable 100% Solids	100	0.20	Very poor – strong ridges
Finish 3 - Low Viscosity UV-Crosslinkable 100% Solids	100	0.14	Very poor – uneven gloss ("diving")
Finish 4 - Waterborne UV-Crosslinkable	32	0.12	Very good
Finish 5 – Two-Component Aqueous Polyurethane	45	0.13	Good

The coated tiles were shown to the Examiner in a May 13, 2004 in-person interview, and demonstrated that a very poor ridged coating appearance was obtained when a higher viscosity

100% solids radiation curable finish was applied to an undercoat, and that a very poor uneven gloss coating appearance was obtained when a lower viscosity 100% solids radiation curable finish was applied to an undercoat.

14. All statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the Application or any patent issuing thereon.

Further Declarant saith not.

June 30, 2004
Date

Robert D. P. Hei

Robert D. P. Hei

Enc: Appendix